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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/560,838	04/28/2000	Daniel J. Shoff	MS1-430-US	5056

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EXAMINER

BATAILLE, PIERRE MICHE

ART UNIT	PAPER NUMBER
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2186

DATE MAILED: 03/22/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/560,838

Applicant(s)

SHOFF ET AL.

Examiner

Pierre-Michel Bataille

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 January 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-46 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3,7-19,23-35 and 39-46 is/are rejected.
- 7) ☒ Claim(s) 4-6,20-22 and 36-38 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

1. This Office Action is taken in examination of applicant's amendment filed January 27, 2004. Applicant's amendments and/or arguments have been considered with the results that follow.

Response to Arguments

2. Applicant's arguments with respect to claims 1-46 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1, 10, 17, 26, 33, and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 6,078,541 (Kitagawa et al) in view of US 6,681,305 (Franke et al).

With respect to claims 1, 17, and 33, Kitagawa teaches a device controller for controlling the operation of a non-volatile memory and providing application accessing the non-volatile memory [Fig. 1-2; Col. 2, Lines 2-6]: comprising an operating system (device operating program) and device driver (device controller being for any peripheral device), wherein the operating system is configured to exchange input/output (I/O) requests with the applications and exchange corresponding file system requests with

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the device driver [Col. 2, Lines 57-67], and wherein the device driver is configured to store the file system data (digital information) received from the operating system in a plurality of reserved sectors within the non-volatile memory (non-volatile memory 201), compress the file system data stored within the plurality of reserved sectors to create a compressed data block and stored the compressed data block in at least one physical subsectors within the non-volatile memory [abstract; Col. 2, Lines 3-18]. Kitagawa fails to specifically teach physical sector associated with at least one virtual sector identifiable through sector allocation stored in a volatile memory that is operatively accessible by an operating system. However, Franke discloses effective virtual memory management within an operating system to dynamically adjust the expanded real memory size that the operating system considers for its operation as a function of the physical memory utilization at a given time [Col. 3, Lines 41-50], such that compression of main memory contents presents to the operating systems an expanded real memory larger than the physically available memory [Col. 3, Lines 40-50; Col. 8, Lines 1-8]. Therefore, it would have been obvious to one of ordinary skill in the art to modify the operation of Kitagawa by compressing data block stored in physical sectors with at least one virtual sector identifiable through sector allocation in the operating system, as taught by Franke, because the result would have permitted compression of main memory contents presenting to the operating systems an expanded real memory larger than the physically available memory, as taught by Franke [Col. 3, Lines 41-45]. As a result, physical memory will never be exhausted.

With respect to claims 10, 26, and 42, Kitagawa teaches storing the compressed data block in at least one physical sub-sector and maintaining input/output operation status information within the non-volatile memory device during on-going I/O operations [Col. 2, Lines 65-67].

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 2-3, 7-9, 11-16, 18-19, 23-25, 27-32, 34-35, 39-41, and 43-46 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 6,078,541 (Kitagawa et al) in view of US 6,681,305 (Franke et al) and further in view of US 6,401,181 (Frasaszek et al).

With respect to claims 2, 18, and 34, the combination of Kitagawa and Franke teaches the invention as claimed and noted above in claims 1, 17, and 33, but fails to teach presenting to the operating system with a plurality of operatively accessible virtual sectors resulting in memory capacity that exceeds the actual physical capacity of the non-volatile memory. However, Franaszek teaches dynamic allocation of physical memory space that present to an operating system with a plurality of operatively accessible virtual sectors resulting in memory capacity that exceeds the actual physical capacity of the non-volatile memory [Col. 2, Lines 42-48]. Therefore, it would have been obvious to one having ordinary skill in the art and having the teachings of Kitagawa,

Franke and Franaszek before him/her at the time of the invention to modify the operation of Kitagawa by compressing data block stored in physical sectors with at least one virtual sector identifiable through sector allocation in the operating system, as taught by Franke, and introduce the virtual memory sectors teaching on Franaszek into the application processing features of Kitagawa and Franke and present to an operating system with a plurality of operatively accessible virtual sectors resulting in memory capacity that exceeds the actual physical capacity of the non-volatile memory, as taught by Franaszek because the result would have provided dynamic memory allocation mechanism in the main memory addressing path that exploits the spatial efficiencies of computer main memory indexing schemes, as taught by Franaszek [Col. 2, Lines 42-45]. Franke teaches a system permitting compression of main memory contents presenting to the operating systems an expanded real memory larger than the physically available memory [Col. 3, Lines 41-45].

With respect to claim 3, 19, and 35, Franaszek teaches mapping virtual sectors to at least one physical sector through a virtual sector table stored in RAM (non-volatile memory) and presenting the operating system with the virtual table sector [Fig. 1 and 3; Col. 2, Lines 45-66; Col. 3, Line 60 to Col. 4, Line 3].

With respect to claims 7, 9, 11-16, 23, 25, 27-32, 39-41, and 43-44, Kitagawa teaches the invention as claimed and noted above in claims 1, 17, and 33, but fails to specify associating a physical subsector with at least one virtual sector identifier or mapping a physical subsector to a group identifier. However, Franaszek teaches

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dynamic allocation of physical memory space a low level main memory design for storing compressed data that includes a directory portion and a collection of fixed size blocks which are used to store lines in compressed format, wherein: highly compressible lines may be stored entirely within a directory entry; the directory entry points to one or more of the fixed size blocks which are used to store the line in compressed format; page tables which translate virtual addresses to real addresses which correspond to the location in the directory of the directory entry for the line and which includes information pertaining to blocks holding a compressed line; the information in a directory entry includes flags, fragment combining information, and, assuming fixed size entry structure pointers to one or more fixed size blocks; on a cache miss, the memory controller and decompression hardware finds the blocks allocated to store the compressed line and dynamically decompresses the line to handle the miss [Col. 3, Lines 60 to Col. 4, Line 3; Col. 5, lines 20-65; Col. 6, Lines 24-47].

Therefore, it would have been obvious to one having ordinary skill in the art and having the teachings of Kitagawa, Franke, and Franaszek before him/her at the time of the invention to modify the operation of Kitagawa by compressing data block stored in physical sectors with at least one virtual sector identifiable through sector allocation in the operating system, as taught by Franke, and introduce the virtual memory sectors teaching of Franaszek into the application processing features of Kitagawa and associate a physical subsector with at least one virtual sector identifier or mapping a physical subsector to a group identifier, as taught by Franaszek because the result would have provided schemes for reducing operating system process interruptions

where processor memory read and write operations are expedited without external system interruption. Franaszek further teaches real memory pages may be grouped into classes and the physical memory usage of each of these classes monitored and managed by the dynamic memory system to facilitate the management of these memory pools, and modern operating systems to control pools of memory so that various processes and users share the system resources fairly [Col. 4, Lines 29-37]. Franke teaches a system permitting compression of main memory contents presenting to the operating systems an expanded real memory larger than the physically available memory [Col. 3, Lines 41-45].

With respect to claims 8, 24, and 40, Franaszek teaches storing compresses data in at least one physical subsector within non-volatile memory including writing each physical subsector associated with the compressed data block to the non-volatile memory in a sequential order, but not necessary in contiguous order [Col. 2, Line 66 to Col. 3, Line 4].

Allowable Subject Matter

7. Claims 4-6, 20-22, and 36-38 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

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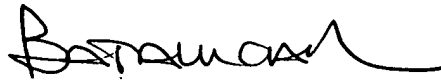
9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Pierre-Michel Bataille whose telephone number is (571) 272-4178. The examiner can normally be reached on Mon-Fri (9:30A to 6:00P).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew M. Kim can be reached on (571) 272-4182. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Pierre-Michel Bataille
Primary Examiner
Art Unit 2186

March 17, 2005

PIERRE BATAILLE
PRIMARY EXAMINER